

SECTION 07142
HOT FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

0.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies hot fluid-applied waterproofing for bridge decks and other applications indicated.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 02780 - UNIT PAVERS, Pavers.
 - 2. Section 07131 - SELF-ADHERING SHEET WATERPROOFING.
 - 3. Section 07141 - COLD FLUID-APPLIED WATERPROOFING.
 - 4. Section 07170 - BENTONITE WATERPROOFING.

0.2 PERFORMANCE REQUIREMENTS

- A.** Provide waterproofing that prevents the passage of water and complies with physical requirements in CAN/CGSB-37.50, "Hot Applied, Rubberized Asphalt for Roofing and Waterproofing".

0.3 SUBMITTALS

- A.** Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties.
- B.** Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.
- C.** Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
- D.** Qualification Data: For Installer and for Testing and Inspection Agency.
- E.** Product Test Reports: From a qualified independent testing agency indicating and interpreting test results of waterproofing for compliance with requirements, based on comprehensive testing of current waterproofing formulations.

- F.** Test Reports: From Testing and Inspection Agency.
- G.** Sample Warranty: Copy of special waterproofing manufacturer's and Installer's warranty stating obligations, remedies, limitations, and exclusions before starting waterproofing.

0.4 QUALITY ASSURANCE

- A.** Installer Qualifications: A qualified installer who is authorized, approved, or licensed to install waterproofing manufacturer's products; and who is eligible to receive waterproofing warranty specified.
- B.** Mockups: Apply 100 square feet of waterproofing to demonstrate surface preparation, crack and joint treatment, corner treatment, thickness, texture, and execution quality.
 - 1. If Engineer determines mockups do not comply with requirements, reapply waterproofing until mockups are approved.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- C.** Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1. Review requirements for waterproofing, including surface preparation specified under other Sections, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

0.5 DELIVERY, STORAGE, AND HANDLING

- A.** Deliver liquid materials to Project site in original containers with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B.** Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer.
- C.** Remove and replace liquid materials that cannot be applied within their stated shelf life.
- D.** Protect stored materials from direct sunlight.

0.6 PROJECT CONDITIONS

- A.** Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing

manufacturer. Do not apply waterproofing to a damp or wet substrate, or when temperature is below 0 deg F. Do not apply waterproofing in snow, rain, fog, or mist.

- B.** Maintain adequate ventilation during application and curing of waterproofing materials.

0.7 WARRANTY

- A.** Special Manufacturer's Warranty: Written warranty, signed by waterproofing manufacturer agreeing to repair or replace waterproofing and sheet flashings that do not comply with requirements or that do not remain watertight within specified warranty period.
 - 1. Warranty does not include failure of waterproofing due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in substrate that exceed 1/8 inch in width.
 - 2. Warranty includes removing and reinstalling protection board, drainage panels, insulation, pedestals, and pavers on plaza decks.
 - 3. Warranty Period: Five years after date of Substantial Completion.

PART 2 - PRODUCTS

0.1 MANUFACTURERS

- A.** Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Hydrotech, Inc.; Monolithic Membrane 6125.
 - 2. Carlisle Corporation, Carlisle Coatings & Waterproofing Div.; CCW-500.
 - 3. T. C. Miradri; Miraseal 9100.
 - 4. Monsey Bakor; Elasto-Seal 790-11.
 - 5. Tremco; Tremproof 150.

0.2 MEMBRANE

- A.** Single-component; 100 percent solids; hot fluid-applied, rubberized asphalt with the following properties measured per applicable test methods in CAN/CGSB-37.50:
 - 1. Flash Point: Not less than 260 deg C or not less than 25 deg C above manufacturer's maximum recommended application temperature.
 - 2. Cone Penetration: 110 maximum at 25 deg C, and 200 maximum at 50 deg C.

3. Flow: 3 mm maximum at 60 deg C.
4. Toughness: Not less than 5.5 J.
5. Ratio of Toughness to Peak Load: Not less than 0.040.
6. Adhesion Rating: Pass.
7. Water-Vapor Permeance: 1.7 ng/Pa x s x sq. m.
8. Water Absorption: 0.35-g maximum mass gain, or 0.18-g maximum mass loss.
9. Pinholing: Not more than one pinhole.
10. Low-Temperature Flexibility: No cracking.
11. Crack Bridging Capability: No cracking, splitting, or loss of adhesion.
12. Heat Stability: Comply with requirements for penetration, flow, low-temperature flexibility, and viscosity when heated for five hours at manufacturer's recommended application temperature.
13. Viscosity Test: 2 to 15 seconds.

0.3 AUXILIARY MATERIALS

- A.** Primer: ASTM D 41, asphaltic primer.
- B.** Elastomeric Flashing Sheet: 50-mil-minimum, nonstaining, uncured sheet neoprene with manufacturer's recommended contact adhesives and predrilled metal termination bars and anchors, with the following physical properties as measured per standard test methods referenced:
 1. Tensile Strength: 1400 psi minimum; ASTM D 412, Die C.
 2. Elongation: 300 percent minimum; ASTM D 412.
 3. Tear Resistance: 125 psi minimum; ASTM D 624, Die C.
 4. Brittleness: Does not break at minus 30 deg F; ASTM D 2137.
- C.** Sealants and Accessories: Waterproofing manufacturer's recommended sealants and accessories.
- D.** Reinforcing Fabric: Manufacturer's recommended spun-bonded polyester fabric.
- E.** Separator Sheet: ASTM D 4397, polyethylene sheet, minimum 4 mils thick.
- F.** Protection Course: Semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:
 1. Thickness: 1/8 inch, nominal, for vertical applications, 1/4 inch, nominal, elsewhere.
 2. Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for type of protection course.

0.4 MOLDED-SHEET DRAINAGE PANELS

- A.** Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to 1 side and a polymeric film bonded to the other side of a 3-dimensional, nonbiodegradable, molded-plastic-sheet drainage core, with a vertical flow rate of 9 to 15 gpm per ft.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Sure-Drain V.
 - b. W. R. Grace Hydroduct 2 or HZ
 - c. Miradri Miradrain 6200 or 6200XL

PART 3 - EXECUTION

0.1 EXAMINATION

- A.** Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
 2. Verify that substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

0.2 PREPARATION

- A.** Clean and prepare substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.
- B.** Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C.** Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.
- D.** Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

1. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate according to ASTM D 4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces according to ASTM D 4258.
- E. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.

0.3 JOINTS, CRACKS, AND TERMINATIONS

- A. Prepare and treat substrates to receive waterproofing membrane, including joints and cracks, deck drains, corners, and penetrations according to CAN/CGSB-37.51, "Application of Rubberized Asphalt, Hot-Applied, for Roofing and Waterproofing", and waterproofing system manufacturer's written instructions.
1. Rout and fill joints and cracks in substrate. Before filling, remove dust and dirt according to ASTM D 4258.
 2. Embed reinforcing fabric into a layer of hot, rubberized asphalt. Extend reinforcing fabric a minimum of 6 inches on each side of joints and cracks and beyond deck drains, corners, and penetrations.
- B. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge joints with elastomeric flashing sheet extended a minimum of 6 inches on each side of joints and adhere to substrates in a layer of hot, rubberized asphalt.

0.4 FLASHING INSTALLATION

- A. Install flashing sheets at terminations of waterproofing membrane according to CAN/CGSB-37.51, "Application of Rubberized Asphalt, Hot-Applied, for Roofing and Waterproofing", and waterproofing system manufacturer's written instructions.
- B. Prime substrate with asphalt primer.
- C. Install elastomeric flashing sheet and adhere to deck and wall substrates in a layer of hot, rubberized asphalt.
- D. Extend flashing sheet up walls or parapets a minimum of 8 inches above plaza deck pavers and 6 inches onto deck to be waterproofed.
- E. Install termination bars and mechanically fasten to top of flashing sheet at terminations and perimeter of roofing.

0.5 MEMBRANE APPLICATION

- A.** Apply rubberized asphalt according to CAN/CGSB-37.51, "Application of Rubberized Asphalt, Hot-Applied, for Roofing and Waterproofing", and manufacturer's written instructions.
- B.** Heat rubberized asphalt in an oil- or air-jacketed melter with mechanical agitator specifically designed for heating rubberized-asphalt waterproofing.
- C.** Start application with manufacturer's technical representative present.
- D.** Apply primer, at manufacturer's recommended rate, over prepared substrate and allow to dry.
- E.** Reinforced Membrane: Apply waterproofing to substrates and adjoining surfaces indicated. Spread hot fluid-applied, rubberized asphalt to a thickness of 90 mils; embed reinforcing fabric, overlapping sheets 2 inches; and spread another 125-mil-thick layer to provide a uniform, reinforced, seamless membrane 215 mils thick.
- F.** Apply waterproofing over prepared joints and up wall terminations and vertical surfaces to heights indicated or required by manufacturer.
- G.** Cover waterproofing with separator sheet with overlapped joints while rubberized asphalt is still hot and before membrane is subject to traffic. Install protection course with overlapped joints over separator sheet.

0.6 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- A.** Place and secure molded-sheet drainage panels to substrate according to manufacturer's written instructions. Use adhesives that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction. For vertical applications, install board insulation used as a protection course before installing drainage panels.

0.7 FIELD QUALITY CONTROL

- A.** Flood Testing: Flood test each deck area for leaks, according to recommendations in ASTM D 5957, after completing waterproofing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
 - 1. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and not exceeding a depth of 4 inches. Maintain 2 inches of clearance from top of sheet flashings.
 - 2. Flood each area for 24 hours.
 - 3. After flood testing, repair leaks, repeat flood tests, and make further repairs until waterproofing installation is watertight.

- B.** Engage an independent testing agency to observe flood testing and examine underside of decks and terminations for evidence of leaks during flood testing.

0.8 CURING, PROTECTING, AND CLEANING

- A.** Cure waterproofing according to manufacturer's written recommendations, taking care to prevent contamination and damage during application stages and curing. Do not permit foot or vehicular traffic on unprotected membrane.
- B.** Protect waterproofing from damage and wear during remainder of construction period.
- C.** Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

PART 4 - MEASUREMENT AND PAYMENT

0.1 MEASUREMENT

- A.** Hot fluid-applied waterproofing will be measured as per square foot complete in place, including all preparation, accessories and incidentals.

0.2 PAYMENT

- A.** Payment for hot fluid-applied waterproofing will be made at the Contract unit price for the quantities as specified above.

0.3 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0710.002	HOT FLUID-APPLIED WATERPROOFING	SF

END OF SECTION

NOTES TO THE DESIGNER

- A.** Any request to modify or waive the specification requirements listed below must be approved in writing by the MBTA's Director of Design:

1. None